BACK-UP REINFORCER EFFECTIVENESS IN CLASSROOM BEHAVIOURAL SELF MANAGEMENT

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ABSTRACT

A behavioural self management program was directly introduced into a class of mildly intellectually retarded boys.

Self assessment alone was shown to be potentially responsible for a major part of the behaviour change produced by self management programs. Only one of three self assessment plus positive self reinforcement phases, that using 'access' back-up reinforcers, produced behaviour change beyond that attributed to self assessment alone. No behaviour change occurred when low value 'consumption' back-up reinforcers were provided and the introduction of high value 'consumption' back-up reinforcers resulted in a decrease in the level of on-task behaviour. Accuracy in self assessment was inversely related to the magnitude of back-up reinforcer.

The functional relationship of reinforcer magnitude, accuracy of self assessment and degree of behaviour change is examined. The results are discussed in relation to other studies in self management and the implications for the use of self management procedures in classroom control noted.

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CHAPTER I

INTRODUCTION

I. GENERAL INTRODUCTION

Historically, the notion of self control has usually been discussed in relation to prevailing accounts of the causes of human behaviour. These causes have traditionally been located within the internal dynamic structure of the individual. Thus self control has been seen as a function of the soul, the psyche, the mind, instinct and the will and its 'possession' as a virtue, evidence of good internal order, rational, a habit or a matter of willpower. In much of contemporary psychological theory, the 'self' is seen as the pilot of individual behaviour, and relatively immune to environmental influences, although not immune to therapeutic intervention.

More recently, in operant psychology, self control has been examined in relation to environmental determinants of behaviour.

> When a man controls himself, chooses a course of action, thinks out the solution to a problem, or strives toward an increase in self knowledge, he is behaving. He controls himself precisely as he would control the behvaiour of anyone else - through the manipulation of variables of which behaviour is a function. His behaviour in so doing is a proper object of analysis, and eventually it must be accounted for with variables lying outside the individual himself.

(Skinner, 1953, p.228)

Skinner (1953) also made an important distinction between 'controlled' and 'controlling' behavioural responses. The controlled response is defined as the target response, the behaviour to be modified, and the controlling response as the set of behaviours manipulated to effect this modification. The focus of analysis in operant psychology is on the way in which the environment selects behaviours. Behaviours are selected because of their survival value for the species (e.g. food, water, sexual contact, escape from harm) or because they facilitate behaviours having high survival of the species in a sense operated on by the environment and are more likely to occur.

> The behaviour is said to be strengthened by its consequences and for that reason the consequences are called 'reinforcers'... Operant conditioning thus, is the process through which a person comes to deal effectively with his environment.
>
> (Skinner, 1974, p.39)

Controlling responses then, can be seen as the manipulation of reinforcement contingencies available in the environment. Skinner (1971) believes individuals should be taught the rudiments of the operant analysis of behaviour in order to maximise individual freedom through the educated exercise of 'counter control'. Ironically in this analysis those individuals having the most precise knowledge of the way in which their behaviour is shaped by the environment, are the least likely to regard self control as attainable.

A fundamental problem confronting any researcher in

the field of self control is to explain how the organism maintains or initiates a behaviour in the absence of external environmental control. Self control always involves the organism either remaining in an aversive situation or withholding from reinforcers available in the environment. This would seem to be a denial of a fundamental proposition in operant psychology; that is that positive reinforcers are necessarily highly probable behaviours, and negative reinforcers are located as behaviours having a low probability of occurance. Gerwitz (1971), Premack (1965, 1971) and others maintain that self control as an ideal can never exist. They maintain that apparent instances of self control can be fully explained by referring to the reinforcement history of the individual. As much of the reinforcement history of an individual is unknown to the researcher, some behaviours may indeed appear not to be maintained by current reinforcement contingencies. However Gerwitz (1971) believes that there is no reason to posit other (e.g. 'Social learning') explanations the only evidence for which is in the very behaviour they are intended to explain. Extrinsic intermittent reinforcement schedules could more parsimoniously explain these apparent instances of self control.

To avoid the 'mentalist' (Skinner 1953, 1969, 1974) associations of the word 'self' (that behaviour originates from within the organism) Kanfer and Karoly (1972) refer

to 'Alpha' and 'Beta' regulation. Alpha regulation refers to behaviour unambiguously manipulated by the environment and Beta regulation posits mediating influence between the environment and the behaviour, but acknowledging the ultimate environmental source of control.

Self control as a therapeutic strategy, involves training the individual to control reinforcement contingencies so as to effect a change in some target behaviour. 'Self management' is a summary term preferred by some writers (e.g. Mahoney, 1972) to 'self control' or 'self regulation'. Self management has been simply defined by Cautela (1969) as any response made by the individual to modify the probability of another response. Thus in this analysis the individual does not 'exhibit' or 'have' self control, but if suitable reinforcement contingencies are available, can initiate 'controlling' responses. It is the functional relationship between controlled and controlling responses, that research in self management (and operant psychology) examines. The functional relationship between the controlling and controlled response can be seen as part of a stimulus response chain, ultimately responsive to environmental influences. Training in self management could be seen as bringing the self reinforcing response under the control of a single class of stimuli (e.g. the performance of a

target response). Thus therapeutic intervention in self management is focused on reinforcing appropriate controlling responses rather than directly reinforcing the target response. Gerwitz (1971) uses the term 'matching to sample' to describe the process of building stimulus - response chains. Self management in this analysis would be a useful technique in environments where agencies for the distribution of reinforcement were not available. It assumes that somehow the self controlling response could be taught or maintained in such an environment.

Kanfer and Karoly (1972) outlined a working model of self regulation involving self monitioring, self evaluation and self reinforcement components. Some of these components could be seen as parts of a stimulus-response chain concluding with the self reinforcement response being brought under the control of a target behaviour. However Kanfer and Karoly (1972) posit and stress the importance of the covert 'mediating' self evaluative response between the self monitioring and self reinforcement responses. Bandura (1969) and others (Bower, 1970; Kanfer and Phillips, 1970; Staats, 1972) claim that covert processes are essential to the understanding of self management and all complex human behaviour.

Three major streams of research have studied the determinants of self-reinforcement in the laboratory and

imply the presence of other than environmental determinants of behaviour.

> The empirical support from studies on self reinforcement provides increasing evidence... that has the special function of controlling the persons behaviour, independent of momentarily environmental circumstances, thereby fostering the autonomy of human organisms'
>
> (Kanfer and Phillips, 1970, p.421)

The three research paradigms which will now be briefly reviewed, have sought to illuminate conditions under which the individual displays self control in the absence of immediate external constraints, by either engaging in behaviours of previous low probility or not performing behaviours having a previously high probality of occurance.

(i) The Directed Learning Paradigm

The directed learning paradigm has generally dealt with college students who have been asked to self reinforce (using symbolic rewards) success in verbal or perceptual learning tasks, following training with externally administered reinforcement.

Variables affecting the rate of self reinforcement which have been studies in this paradigm :

- amount of initial training (Kanfer, Bradley and Marston, 1962)

- type of training (Kanfer and Duerfeldt, 1967; Kanfer and Marston, 1963 a,b,; Kanfer and Zich, 1974)

- rate of external reinforcement during initial training (Dorsey, Kanfer and Duerfeldt, 1971; Kanfer 1964; Kanfer and Duerfeldt, 1968b; Marston, 1964a)

- task ambiguity, Reschly (1973)

- role of personality variables, (Glaser, 1972; Kanfer, 1966 a,b,; Kanfer and Duerfeldt, 1968a; Marston, 1964c)

- age, sex and academic success; Thoresen and Hosford (1973).

These findings have been reviewed by Kanfer (1967b, 1970) and their significance in behaviour modification by Marston and Feldman (1971).

(ii) The Vicarious (Social) Learning Paradigm

A set of studies by Bandura and co-workers has sought to illuminate the role of modeling processes in the transmission of self reinforcement patterns. Typically the research has investigated the self rewarding responses of young children who have had the opportunity to observe self rewarding behaviours of adults or peers. The hand turning of a crank and games of bowls have been the common modeled and reinforced responses. Among the variables examined have been:

- characteristics of the model (Bandura, Grusec and

Menlove, 1967; Bandura and Kupers, 1964)

- standards set for self rewards (Bandura and Whalen, 1966; Rosenhorn, Frederick and Burrowes, 1968)

- discrepancy between model and subject standards (Bandura and Whalen, 1966; Mischel and Liebert, 1966)

- relationship of the model to the subject (Bandura, Grusec and Menlove, 1967; Bandura and Kupers, 1964; Colle and Bee, 1968)

- effect of reward magnitude (Liebert and Allen, 1967; McMains, Liebert, Hill, Spiegler and Baker, 1969)

- type of training (Allen and Liebert, 1969 a,b,; Liebert and Ora, 1968)

- relative effects of external and self reinforcement (Bandrua and Perloff, 1967; Liebert, Spiegler and Hall, 1970).

(iii) The Temptation Paradigm

Studies on children's 'cheating' in controlled situations are relevant to self management. The self presenting of 'unearned rewards' has been examined in relation to the child's age, academic standing, the magnitude of the reward and the availability of adult 'cheating' models in studies by Kanfer (1966b), Kanfer and Duerfeldt (1968), Mischel and Gilligan (1964).

II. NATURE AND SCOPE OF THE STUDY

The study was designed to separate the contribution of self assessment alone to changes in level of behaviour from the self assessment plus positive self reinforcement component of the self management paradigm. The effect on level of target behaviour of using back-up reinforcers of different magnitude (high and low value) and type ('access' and 'consumption'), may account for some of the discrepant findings in the field. Back-up reinforcer effectiveness is operationally determined by comparing increases in the level of target ('on task') behaviour of the self assessment plus self reinforcement phases to that of the prior self assessment alone phases. Of particular interest is the functional relationship of accuracy of self assessment, magnitude and type of back-up reinforcer, and behaviour change.

The direct introduction of the self management program, while not generally considered conducive to producing change in behaviour, is necessary for the purpose of this study.

The dependent variable analysed in the study is the level of 'on task' behaviour of the pupils. 'On task' behaviour is behaviour defined as being socially

appropriate, and appropriate for the completion of academic tasks.

Winett and Winkler (1972) have criticised researchers for focusing on problem classroom behaviour rather than academic behaviour. However in the present study an operant reversal design was chosen to investigate the components of self management, and academic behaviour is not amenable to an analysis within this design.

A class of mildly intellectually handicapped boys were selected as a subject population for the study. The use of an experimental population new to self management studies in the classroom may be an interesting feature.

In the interests of clarity, terms such as 'self assessment', 'accuracy of self assessment', 'self reinforcement' etc. preferred by the majority of experimenters in the field, are freely used. This facilitates a concise comparison of the results of this study with other studies and is not intended to imply a conceptual agreement about the nature of the self management process held by other researchers also using these terms.

CHAPTER II

OVERVIEW OF CLINICAL APPLICATION OF OPERANT SELF MANAGEMENT TECHNIQUES

I. OVERT BEHAVIOURAL SELF MANAGEMENT

A number of authors have explicitly recommended the teaching of techniques of self management. Goldfried and Merbaum (1973) wrote:

> the ultimate goal of therapy is to provide the client with the resources to cope independently with his own life. (p.33)

Atthowe (1973) thought self management useful for ensuring the maintenance of newly acquired behaviours and Cautela (1973) thought it useful in making the development of future maladaptive behaviours less likely especially where external control is weak. The 'instigation therapy' of Kanfer and Phillips (1970) aimed at teaching self management procedures to clients whose behaviour was sufficiently intact to permit their co-operation and whose environment was not easily controlled, and also to all clients following treatment as a continuous 'booster'. Self management techniques have also been thought useful for adaption to rapid cultural change (Kanfer and Karoly, 1972).

Two broad strategies of self management have been outlined by Thoreson and Mahoney, (1974): Environmental Planning (Stimulus control) and Behavioural Programming (Self presented consequence). The clinical application of these will be discussed below.

(a) Self presentation of consequences following the occurrence of a target response (Behavioural Programming)

(i) Self assessment. A recent issue in self management techniques has involved probing the contribution which self assessment alone makes to the total behaviour change process within the self management paradigm. Self assessment alone has been shown to produce bahaviour change (Broden, Hall and Mitts, 1971; Gottman and McFall, 1972; Johnson and White, 1971 and Mahoney, Moore, Wade and Moura, 1973). In a study of smoking behaviour, McFall and Hammen (1971) were unable, perhaps because of methodological problems, to indicate which of four treatments, positive self monitoring, negative self monitoring, self monitoring and fixed positive self monitoring was the most effective. McNamara (1972) found no significant treatment effects in nailbiting between a self observing group and a group observing incompatible responses. Self assessment was as effective as 'flooding' in a study by Emmelkamp (1974).

There are indications that self assessment is most

effective when combined with other treatment strategies (Mahoney, 1974). Self monitoring has been found to be less effective alone that when combined with self reward and self pubishment (Mahoney, Moura and Wade, 1973).

(ii) Self reinforcement. Only one application of negative self reinforcement has been reported (Penich, Filion, Fox and Stunkard, 1971). In contrast, there are many studies reporting the successful application positive self reinforcement techniques (Goodlet and Goodlet, 1969; Jackson and Van Zoost, 1972; Lovitt and Curtis, 1969; Mahoney, 1971 and Rehm and Marston, 1968). Target behaviours ranging from weight control, studying, to heterosexual relations have been modified. Typically other therapeutic strategies such as stimulus control, have been involved in the clinical application of self reinforcement (Johnson, 1971; Mahoney, 1971). However studies investigating the relative effectiveness of the processes involved have been undertaken. In the area of weight control, Mahoney (1974) and Mahoney, Moura and Wade (1973)have found self reinforcement to be more effective than self monitoring, self punishment or stimulus control procedures alone. The equal effectiveness of self reinforcement compared to externally administered reinforcement has been indicated in a number of studies(Bolstad and Johnson, 1972; Glynn, 1970; Goodlet and Goodlet, 1969 and Lovitt and Curtiss, 1969).

(iii) Self punishment. The lack of studies using positive self punishment (in which the individual removes a positive consequence), precludes evaluative commentary. Two case histories have been presented by Axelrod, Hall, Weis and Roper (1973).

Negative self punishment, the presentation of aversive consequences (e.g. electric shock), has proved useful in modifying smoking, alcoholism and sexual deviation (McGuire and Vallance, 1964), deviant sexual fantasies (Mees, 1966a) and stuttering (Goldiamond, 1965b). The effectiveness of placebo 'treatment; has proved troublesome in some studies (Keutzer, 1968; Lichenstein and Keutzer, 1969; Ober, 1968; Tyler and Straughan, 1970). Weigartner (1971) explicitily tested for and acknowledged the effect of placebo treatment in a negative self punishment study.

(b) Stimulus Control (Environmental Planning)

As the probability of a given response is influenced by the presence or absence of stimuli previously associated with that response, the general strategy in stimulus control has been to reduce those cues for decelerative target responses (e.g. smoking) and increase them for accelerative target responses (e.g. studying). Competitive adaptive behaviours have generally been introduced into the maladaptive response chain. Most

studies have combined other strategies (e.g. self reinforcement) with stimulus control.

Stuart (1967) successfully treated eight obese women by having them eat in restricted and drab settings. Fox (1962) increased the study behaviour of a client by having him study in only one room, thus establishing an association between the room and study behaviour. Nolan (1968) and Roberts (1969) by restricting smoking to a 'smoking chair' placed in a garage, successfully reduced the smoking behaviour of clients. In this instance smoking was not reinforced by other pleasant activities (e.g. talking, eating) nor were the usual environmental cues for smoking (e.g. ashtrays) available. By first associating the ringing of a portable timer with smoking Bernard and Efran (1972) Levinson, Shapiro, Schwartz and Tursky (1971) reduced the instance of smoking by progressively increasing the intervals between timer rings.

Pre-arranging behavioural consequences (contingency contracting) for target behaviours has been a popular method in stimulus control research. Mann (1972) had overweight clients deposit valuable personal effects with him, which could be earned back at a rate proportional to weight loss. A cigarette case which delivered an electric shock when opened was used by Powell and Azrin (1968).

II. COVERT BEHAVIOUR MODIFICATION AND SELF CONTROL

Covert behaviour has been identified as a proper field of study within the behaviourist field:

> ... it is particularly important that a science of behaviour must consider events taking place within the skin of organisms, not as physiological mediators of behaviour but as part of behaviour itself.
>
> (Skinner, 1963, p.953)

Because covert behaviours include 'thinking'; 'perceiving'; 'knowing' etcetera, they are closely tied to issues in self management.

A distinction between covert and overt behaviour is more a matter of methodological convenience (covert behaviours are simply less public behaviours) than expressing a philisophical (Ryle, 1940) or psychological truth. "It is simply more behaviour to be explained" (Skinner, 1974, p.103).

Most researchers (e.g. Mahoney, Thoresen and Danaher, 1973a) believe that covert behaviours can and must be studied in exactly the same way as overt behaviours. Bower (1970) classified covert responses as antecedents, target behaviours and consequences, a classification utilized in Thoresen and Mahoney's (1974) discussion.

The use of covert responses as antecedents

to behavioural responses is best illustrated in desensitization procedures which follow Wolpe's (1958) model. Wolpe paired progressively more fear arousing covert stimuli (thoughts) with an incompatible (non fear arousing) response; that of deep muscular relaxation. When a heirarchy of covert 'fearful' stimuli were thus progressively presented to the relaxed individual, they tended less and less to produce anxiety. Eventually the feared image or even its physical referent, could be tolerated in full strength.

Homme's (1965) paper, "Control of Coverants: The operants of the mind" has stimulated much research on covert responses as target behaviours. Homme utilized (erroneously according to Thoresen and Mahoney, 1974) "Premack's Principle" (1965) "For any pair of responses the more probable one will reinforce the less probable one", for the identification and control of covert reinforcers. Thus he accepted Skinner's (1953) statement:

> We need not suppose that events which have taken place within an organism's skin have special properties for that reason. (p.285)

and used the same methodological approach as for overt behaviours. Only one study (Horan and Johnson, 1971) has reported the successful application of Homme's thesis. Many other studies using modified versions of the procedure have been reported.

Counter conditioning paradigms, termed 'covert sensitization' by Cautela (1966) have been used in the treatment of alcoholism (Ashem and Donner, 1968), pedophilia (sexual attraction to young girls), - (Barlow, Leitenberg and Agras, 1969) homosexuality (Barlow, Agras and Leitenberg, 1970) and smoking (Wagner and Bragg, 1970). The treatment typically involved 'imagining' the decelerative target behaviour in association with affectively unpleasant thoughts (e.g. vomiting, imprisonment, lung cancer etcetera). Similarly, appropriate behaviour is imagined in association with affectively pleasant consequences. The use of covert reinforcement for preceding covert behaviours has recieved only limited attention. Cautela (1970a,b, 1971b) has investigated covert positive reinforcement, covert negative reinforcement, covert extinction and covert modeling procedures in a number of studies.

CHAPTER III

SELF MANAGEMENT IN THE CLASSROOM, REVIEW OF LITERATURE

Despite the interest educators might be thought to have in training children in 'independence' and 'responsibility', there are very few studies outlining the techniques through which children can be systematically taught self management. Releasing the teacher from a possibly onerous burden by transferring control to the child, might be thought sufficiently reinforcing to stimulate research in the area. However the very vagueness of many educational aims and philosophies seems to have militated against a scientific approach to classroom self management.

Research has tended to focus instead on the analysis of externally managed control systems. Most commonly teachers have been instructed to contingently use attention, praise and approval as social reinforcers in such studies. More elaborate 'token economy' systems have been used in the classroom, for example to modify disruptive behaviour and increase levels of study behaviour and academic achievement. Token reinforcement systems have been extensively used with backward children. The field has recently been reviewed by Kazdin and Bootzin (1972) and O'Leary and Drabman (1971). O'Leary and Drabman (1971) outlined the basic ingredients of a token reinforcement program

(ingredients shared by many self management programs) as '(a) set of instructions to the class about the behaviours that will be reinforced (b) by means of making a potentially reinforcing stimulus - usually called a token-contingent upon behaviour, and (c) a set of rules governing the exchange of tokens for back-up reinforcers such as praise or opportunities to engage in special activities'(p.381). Ayllon and Azrin (1968a) and Kazdin and Bootzin (1972) noted the advantages of using a token system. Of these immediacy of reinforcement, allowing sequences of responses to be reinforced without interruption, resistence to satiation effects and administrative convenience contribute most to the efficacy and popularity of such systems. A problem which has concerned some authors (Levine and Fasnacht,1974; Lindsley, 1964) is that of poor generalization of treatment effects across time and situations. Although as Baer, Wolf and Risely (1968) have emphasised 'generalization should be programmed rather than lamented' (p.97), studies reporting a programming of generalization are rare. Kaufman and O'Leary (1972) provide the only illustration of the use of self management to specifically program for such generalization. Kadzin and Bootzin (1972) consider self reinforcement to be a technique of considerable potential to program for generalization. 'If an individual can be trained to reward himself, or develop his own contingencies,

it is more likely that he will be able to monitor his behaviour in a number of settings'. (p.363).

Self managed contingencies of reinforcement have been found to be at least as effective as externally managed contingencies (Bolstad and Johnson, 1972; Knapezyk and Livingston, 1973) and experimenter determined group-contingencies (Glynn and Thomas, 1974). A self evaluative phase with consequential reinforcement was successful in maintaining a low rate of disruptive behaviour following the withdrawal of a conventional token reinforcement program in a study by Kaufman and O'Leary (1972). Drabman, Spitalnik and O'Leary (1973)were similiarly successful in teaching self management techniques. In this study, generalization of appropriate behaviour was obtained beyond the times in which the program was in effect. Broden, Hall and Mitts (1971) used self recording procedures in classroom settings to increase the study behaviours of an 8th grade boy. They suggested that self reinforcing procedures would be maximally effective if used in conjunction with other established reinforcing techniques, such as teacher praise and tokens.

An unsuccessful self management program has been recently reported by Santogrossi, O'Leary, Romanczyh and Kaufman (1973). A 'teacher determined points' phase was

successful in reducing disruptive behaviour however. Self evaluation plus self reinforcement was not initially successful in increasing rates of 'on task' behaviour in the study by Glynn and Thomas (1974), until a cueing device, a chart specifying the current on task behaviour, was introduced.

Jackson and Glynn (1974) following Glynn, Thomas and Shee (1973), and Bandura and Perloff (1967) outlined a conceptual base for the analysis of self control as follows:

1. Specification of behavioural criteria.
2. Self-evaluation. The individual may examine his own behaviour and decide whether or not be has performed a specific behaviour or class of behaviours.
3. Self-recording. The individual may objectively record the frequency of his performance of a given behaviour or a class of behaviours.
4. Self determination of reinforcement. The individual may determine from all available reinforcers the nature and amount of reinforcement he should receive contingent upon his performance of a given behaviour or class of behaviours.
5. Self administration of reinforcement. The individual dispenses his own reinforcement (which may or may not be self-determined) contingent upon his performance of a given behaviour or class of behaviours.

The effectiveness of these conceptual components as treatment procedures have received some attention.

Lovitt and Curtiss (1969) with a 12 year old student, found that higher rates of responding occurred when the student rather than the teacher arranged the contingency requirements. In a study using 128 girls, Glynn (1970) found that experimenter determined reinforcement contingencies were no more effective than self determined contingencies in modifying behaviour. Felixbrod and O'Leary (1973) demonstrated the effectiveness of contingent reinforcement in a situation in which performance standards were self determined. The superiority of self imposed contingencies reported by Lovitt and Curtiss (1969) was not observed in this study.

The 'self monitoring' and 'self recording' components of self control have usually been considered together in that 'self recording' presupposes 'self monitoring' and that the only overt behavioural evidence of an instance of 'self monitoring' is some kind of self record. Self recording alone decreased the head holding behaviour of a twelve year old girl (Fabry 1973), but the change was not maintained over a period of time. Neither self recording nor teacher recording was successful in reducing a deviant behaviour of a nine year old boy (Milar, 1974). Although highly correlated with

external evaluations, self evaluation did not lead to a similar reduction in the disruptive behaviour of nine adolescent boys in a school attached to a Psychiatric Hospital (Santogrossi et al, 1973). The importance of accuracy in 'self assessment' to enable the contingent presentation of reinforcement, is highlighted by later phases of the Santogrossi et al (1973) study in which inaccurate self observation resulted in an increase to prior rates of disruptive behaviour. Enhancement of accuracy in self assessment, with a consequent increase in 'on task' behaviour, was effected by cueing (indicating current behavioural requirements on a chart by Glynn and Thomas (1974).

Prior experience with externally administered reinforcement is an integral part of many studies. Thus Bolstad and Johnson (1972), Kaufman and O'Leary (1972) and Glynn et al (1973) all introduced self reinforcement procedures following a period of reinforcement experience involving external reinforcement procedures. However the Santogrossi et al (1973) study reported the failure of a self reinforcement procedure following a successful teacher determined reinforcement procedure. The authors hypothesised that the short period (9 days compared with 25 days and 50 days in the Kaufman and O'Leary (1972) and

Glynn et al (1973) studies) of experience in an externally determined reinforcement condition may have been responsible for the failure.

Drabman et al (1973) explicitly trained pupils to accurately self assess by providing bonus points to pupils for high agreement with the teachers evaluation. Some authors have tried to introduce self management programs directly, successfully (Lewis, 1973; Jackson and Glynn, 1974) and with equivocal results (Glynn and Thomas, 1974). The Jackson and Glynn study directly compared the performance of two classes, one having no prior experience. Although stable increases were established by directly introducing self reinforcement, the subsequent withdrawal of reinforcement contingencies in contrast to the 'no prior experience class', resulted in a decrease to baseline in on-task behaviour.

Accuracy of self assessment has suffered with the introduction of reinforcement contingencies (Santogrossi et al, 1973). Felixbrod and O'Leary (1973) suggest that children may become more lenient in their self imposed standards in the absence of external checking.

Only two studies have used atypical children as subjects. Santogrossi et al (1973) and Kaufman and

O'Leary (1973) conducted studies with pupils from schools within psychiatric hospitals.

The findings thus far in the field are equivocal. Not all self management programs have proven effective. There is good agreement that prior experience with externally administered reinforcement or explicit training in self observation prior to self reinforcement is an advantageous. Many authors have tended to regard 'experience with externally administered reinforcement' as functionally equivalent to explicit 'prior training'. Clearly this is not necessarily the case. Pupils may not generalise from their experiences with externally administered contingencies to the requirements of self managed contingencies. Indeed it is only under strictly controlled conditions, that operant psychologists have been able to similarly analyse reinforcement contingencies.

Although some studies show that self assessment alone can modify behaviour in a desirable direction, there is evidence that such change is transient. There are suggestions that external survellience is necessary to maintain accuracy in self assessment and by extension, maintenance of behaviour change.

Self management remains an ideal. No author has

completely followed the conceptual base of self management first outlined by Bandura and Perloff (1967). Typically the researcher has chosen the back-up reinforcers, constructed the contingencies for their distribution and mediated in their distribution.

CHAPTER IV

METHOD

I. SUBJECTS AND SETTING

Participants in this study were members of a class described as a 'Senior Special Class for Backward Pupils', within a large private residential school for intellectually retarded boys. Fourteen pupils participated in the study, five were lost to it through promotion to or from another class during the course of the study.

The mean age of the nine pupils present for all seven phases of the study was 11 years 8 months (range 9 years 6 months to 13 years 10 months) and the mean I.Q. on the 'Weschler Intelligence Scale for Children' was 71 (I.Q. range 51 to 76).

Two of the nine pupils had clearly defined learning handicaps. One was diagnosed as 'aphasic' and had no verbal language; the other suffered from cerebal palsy, was unable to write legibly and used a typewriter.

Factors other than 'Intellectual Backwardness' influences the admission of these pupils to the school. Many were described prior to admission as 'disturbed','a

behaviour problem', 'neglected', 'from a broken home', 'state ward', etcetera.

One young, trained male teacher conducted the class for the entire period of the study. He had been teaching this particular group of children for six months prior to the investigation and was heavily involved in their residential care in after-school hours. He was a member of the religious order running the school.

No attempt was made to change the organisation, structure or program of the class, in these respects it was very similar to other classes described as 'Senior Special Classes for Backward Pupils'.

The pupils were divided into three groups for instruction. Typically one group would be attended to by the teacher for a reading program while the other two groups independently engaged in written expression exercises provided by the teacher. On completion of these written exercises, the pupils were permitted free reading activities.

Recordings were entered on a separate section of the sheet on occasions when the teacher left the room. Comparisons between levels of 'on task' behaviour for the major set of data (i.e. when the teacher was present) of the experimental session, could thus be made with

'teacher absent' recordings.

The coding sheet listed 15 carefully defined behaviours, 5 defined as 'off task' and 10 as 'on task'. 'On task' behaviours were those thought appropriate for the completion of academic tasks set by the class teacher. To 'earn' an 'on task' entry in the data collection sheet, the pupil had to be continuously engaged in an 'on task' behaviour as defined, for the entire 5 second observation period. When more than one 'on task' behaviour occurred, the observer entered the code of the most persistent behaviour. A slightly different procedure was adopted when more than one defined 'off task' behaviour occurred during a recording interval. On the coding sheet 'off task' behaviours were listed in the following order; 'gross motor movement', 'excess noise', 'fiddling', 'staring', and 'out of room' (the last category was reserved for occasions when pupils were excluded from the class room following inappropriate behaviour). The code for the 'off task' behaviour listed first on the coding sheet was entered when more than one 'off task' behaviour occurred during an observation interval. It was thought that the 'off task' behaviours most likely to attract the attention of other pupils, would be those listed first on the coding sheet, and for that reason usually regarded as the 'most serious' breach of behaviour.

Five days were spent by the researcher in familiarisation tasks in the classroom, prior to the collection of data. This was necessary to -

i. design a suitable coding and recording procedure

ii. learn the names of the pupils and the regular class seating arrangements

iii. enable the pupils to become accustomed to having an observer in the classroom and to learn not to interact with the observer, (see O'Leary and Kent, 1972; Lipinski and Nelson, 1974).

The observer was stationed behind a piano from where all the pupils could be readily observed. The observer ignored any approaches made by the pupils.

Variations on this program included cutting and pasting exercises for a scrapbook, drama, 'listening post' (reading and listening to a tape recording from a book) and following traditional 'blackboard' instruction.

The study covered 44, in the main consecutive school days. Two experimental sessions were conducted for four days of the school week, and one the remaining day. Each session lasted approximately 30 minutes (10.00 to 10.30 a.m. for four days a week and 11.00 to 11.30 a.m.

for five days, i.e. nine sessions per week). There were 72 such sessions. The researcher was absent for one three day period, (between sessions 25 and 26) during which the experimental procedures continued, although no behavioural recordings were made. A two week school holiday intervened between two of the experimental phases, (Phases 3 and 4).

II. OBSERVATION AND RECORDING PROCEDURES

One observer who had prior experience in observing and recording behaviour for Behaviour Modification programs collected all the data for the study. The observer was provided with a stopwatch and a clip-board on which a fresh data collection sheet was attached each session. The observer was also provided with a sheet detailing a specific set of codes to be entered on the data sheet, following the observation of a particular behaviour. (Table 1)

The pupils' names were listed in the left hand column of the data collection sheet, and ten further columns ruled for the entry of the coded observations. The order of the pupils' names and hence the order in which observations were made of each child, was not varied for the experimental sessions. The target child (starting with the name at the top of the list) was observed for five seconds

and the code most accurately describing his behaviour during those five seconds selected and entered on the data collection sheet in the vacant column next to the child's name. Ten seconds were allowed for selection and entry of the appropriate code and for the identification of the child whose name was next on the list. Another five second observation periods followed. Thus four observations for different pupils were made per minute. A total of ten observations were made for each pupil each session.

Observations were discontinued when visitors entered the classroom and resumed when they left.

These observation and recording procedures were followed for all phases of the experiment.

Six independent observers collected data in parallel with the regular observer on twelve separate occasions to establish a measure of inter-observer agreement. Three of the independent observers had prior observation experience in Behaviour Modification studies and three had no such experience. The independent observers were naive to the experimental design.

Five reliability checks were made during the treat-

ment phases of the experiment and seven during the baseline phases. The independent observers followed the same procedures and observed the same child at the same time as the regular observer.

III. EXPERIMENTAL DESIGN

The experiment encompassed seven distinct phases, five involving the manipulation of independent variables ('treatment') and two baseline ('no treatment') phases. The design conformed to an A B C D A B E pattern. (Campbell and Stanley, 1963; Kazdin, 1973).

Phase I: Baseline

During the baseline phase the pupils were observed according to the procedures outlined. This phase did not involve the manipulation of independent variables.

Phase II: Self Assessment

Each pupil was issued with a 'token card' having ten ruled and numbered divisions. On the presentation of a signal (an oven timer set to give a single sharp ring at preselected variable intervals of six minutes) the pupils were required to observe their own behaviour. If engaged in 'on task' behaviour they were instructed to place a 'tick' in the appropriate (i.e. the top 'blank') division of their 'token card'. 'Off task' behaviour was similarly recorded by a 'cross'. 'On task' behaviour

was defined to the pupils as 'having your bottom on the seat of your chair, having a book, paper or pencil in your hand, or looking at the Brother (the teacher) if he has told you to'. Thus an instruction was given to the pupils at the beginning of each session involving the self assessment procedure. "I am going to set the bell. When it rings, I want you to think of what you were doing, and put a tick at the top of your card if you had your bottom on your chair, a book, paper ... etcetera". A similar instruction was given the first time the bell rang in any phase involving self assessment . "The bell has just rung, if you had your bottom ... etcetera." No further comment was made. On the rare occasions a pupil asked "can I put a tick?" or "was I working?", the class teacher would ask the pupil to describe what he was doing and then reply "yes/no, your bottom was ... etcetera." Apart from these instructions, there was no prior training or demonstration of the self assessment procedure.

The oven timer was reset by the observers to a VI 6 minute schedule. It rang five times every session.

Phase III: Self Assessment Plus Self Reinforcement with 'Consumption' Reinforcers

The self assessment procedure continued as in the previous phase. Back-up reinforcers were additionally provided for the pupils to exchange for the self recorded

'ticks'. These were exchanged at 11.45 a.m. each day. For each of the four days in which there were two experimental sessions, a maximum of ten 'ticks' or points could be earned and exchanged by each pupil. Five points could be gained on the remaining day.

At 11.44 a.m. the pupils 'token cards' were collected, points totalled and entered into a 'bankbook'. The class teacher distributed the back-up reinforcers.

The back-up reinforcers were cheap toys and trinkets bought from a large department store and valued at approximately five cents each (Table 2). The pupils were asked which articles they would most like to earn and a ranking of the articles in terms of popularity established. The articles were then placed in five boxes, the most valued articles in one box (called the 'tens' box), the next most valued in another (the 'nines' box) and so on. Pupils scoring the maximum points (ten for four days of the week, five for the remaining day) had a free choice from any box, pupils gaining nine (or four for one day of the week) could choose only from the 'nines' box and so on down to the 'sixes box'.

Phase IV: Self Assessment Plus Self Reinforcement with Enhanced Back-up 'Consumption' Reinforcers

Additional, more expensive articles (average value

fifty cents) were provided as back-up reinforcers for Phase IV (Table II). The reinforcing value of these were determined by the pupils as in Phase III and assigned to the 'tens', 'nines', 'eights' boxes etcetera. The distribution of these back-up reinforcers followed the same pattern as in Phase III.

Phase V: Baseline (Reversal)

This phase was identical to Phase I. No self assessment procedure, ringing of the signal bell or the provision of reinforcers was operative.

Phase VI: Self Assessment

The Self Assessment procedures of Phase II were repeated during Phase VI. No back-up reinforcers were provided.

Phase VII: Self Assessment Plus Self Reinforcement with 'Access' Back-up Reinforcers

Similar back-up reinforcers to those used in Phase V with the addition of five extra sets of toy soldiers were utilized in Phase VII (Table II). The pupils were also asked which of a number of games they would most like to play, given the free opportunity.

This reinforcement contingency entailed access to the back-up reinforcers outlined, rather than the possession or consumption of them as in Phases III and IV. One point

earned was exchanged for a one minute extra access (over a basic five minutes permitted for all pupils) to these reinforcers.

CHAPTER V

RESULTS

I. RELIABILITY OF OBSERVATION AND RECORDING PROCEDURE

From the two simultaneous sets of data collected by the main and independent observers, an estimate of the reliability of the observation and recording procedure was obtained. The percent agreement between the two observers was calculated by dividing the number of agreements by the total number of observations and multiplying by 100. The percent agreement for each of the twelve experimental sessions in which simultaneous recordings were made appears in Table III. The mean percent agreement for all twelve sessions was 85.2% for specific behaviours, and 95.1% for agreement on the 'on task' or 'off task' nature of these behaviours. This high degree of agreement between independent observers indirectly indicates a high degree of reliability within the observation and recording procedure. However, this assumption has been questioned by Romanczyk, Kent, Diament and O'Leary (1973).

In general the main observer rated more conservatively ($\bar{X}$=1.5% points less each session) than the independent observers. The difference in estimates did not vary systematically in the direction of the expected

experimentally induced behaviour change.

No measure of the validity of the procedure was obtained. Lipinski and Nelson (1974) discussed problems in the use of naturalisitic observations as a means of behavioural assessment, noting in particular the effect of loss of information by using behavioural codes, measures necessary for the adequate sampling of behaviour, the reactive nature of observation processes and the problem of observer bias. The present study has endeavoured to control for these possible sources of error.

II. LEVEL OF 'ON TASK' AND 'OFF TASK' BEHAVIOUR (EXTERNAL ASSESSMENT)

Figure I shows the mean percent level of 'on task' behaviour for the nine pupils for each experimental session. These levels were calculated as the ratio of specific 'on task' behaviour to the total number of observations multiplied by 100.

Mean and median levels of 'on task' behaviour and standard deviations for each phase also appear on Figure 1. Percent levels of 'off task' behaviour can simply be derived as 'on task' level minus 100.

The overall significance of the difference in mean

levels of 'on task' behaviour between phases of the experiment was assessed by the Friedman Two Way Analysis of Variance (Seigel, 1956). The differences were significant. (Xr^2 (8) = 31.008, $p < .001$).

Comparisons of the mean level of 'on task' behaviour between selected phases of the experiment were made using the Wilcoxon Matched-Pairs Signed-Ranks Test (Siegel, 1956). The outcome is summarised in Table IV. The mean percent level of 'on task' behaviour for each pupil each phase is presented in Table V. This level was calculated as the ratio of observed 'on task' behaviours to the total number of observations for each experimental session, and averaged for each of the seven phases. Data on all fourteen pupils involved in the experiment is presented in this table.

During the first baseline (non intervention) phase, the mean level of 'on task' behaviour was moderate at 62.8. It increased to 77.6 during the second phase but the increase to 82.6 with the introduction of self reinforcement with low value consumption reinforcers, was not significant. The level dropped sharply to 74.2 with the introduction of high value back-up reinforcers during Phase IV. It remained at a low level ($\bar{X}$ = 71.7) during Phase V, a reversal (non-intervention) condition. With the rein-

troduction of self assessemnt, the level of 'on task' behaviour increases significantly to 78.3, a level comparable to that of the first self assessment condition. The introduction of access back-up reinforcers increased this level further to 84.4, a high stable level.

Thus only one of the three phases in which back-up reinforcers were used had a higher level of 'on task' behaviour than previous self assessment phases. Indeed, the use of high value consumption reinforcers resulted in a decrease pupil performance. Self assessment alone reliably increased the level of performance above baselinelevels.

III. LEVEL OF SPECIFIC BEHAVIOURS

Table VI lists the mean frequency of observations (expressed as a percentage of all observations) of specific behaviours for each experimental phase.

This data is transformed in Table VII to express each 'off task' behaviour as a mean percent of all 'off task' behaviours (rather than as a proportion of both 'off' and 'on task' behaviours as in the previous table). Similarly each 'on task' behaviour is expressed as mean percent of 'on task' behaviours as a whole, for each phase (Table VIII).

(a) 'Off task' Behaviours

Staring (coded S) dropped the most sharply of all the 'off task' behaviours during the experimental contingencies. Motor (M) behaviours dropped during Phase IV, but at the expense of increased levels of S.

The changes during the self reinforcement phases as may be expected, were not systematic. However, for the final phase, which did result in significant increases in 'on task' behaviour, motor (M) and fiddling (F) behaviours decreased the most. There was less noise (N) and staring (S) during both self assessment phases compared to the preceding baseline phases.

(b) Individual Teacher Attention

The teacher spent proportionally less time in a one to one situation with individual pupils in some phases of the experiment than in others (Table VI). He spent the least time with individual pupils during the first and final self reinforcement phases (Phases I and VII) and the most during Phase II (self recording) and Phase IV (the second self reinforcement phase). This data was not analysed for statistical significance.

(c) Writing Behaviour

After each experimental session, the total written

output of each child was assessed. The measure of 'Written output' was the number of correctly spelled and legible written words (or for one pupil, typed), added to the number of words completed, (e.g. the latter for exercises where part-written words were to be completed).

The mean number of words written or completed per child for each experimental phase and for twelve day periods before and after the experimental phases, is presented in Table IX. The greatest number of words was written in Phases II, III, and IV and the least in the first baseline condition and the preceding non-experimental period than in any of the experimental phases except for Phase I. There appeared to be a generalized increase in written output over the experimental period. The differences were statistically significant (Friedman Two Way Analysis of Variance, Xr^2 (8) = 292,1. $p<.001$).

When, for each experimental phase, the mean percent of time the pupils spent writing is held constant, (by dividing 'Aw' observations into number of words and expressing derived baseline score as 1) the proportion of words written or completed again varies over the phases (Table IX). Proportionally fewer words were written in the baseline phases and the final self reinforcement phase. The proportionally highest written output was achieved in the sixth phase of 'self recording'.

IV. ACCURACY OF SELF ASSESSMENT

A measure of the accuracy of pupil self-assessment was obtained by correlating the mean percent level of pupil-assessed 'on task' behaviour (the number of points entered on the token card each session) with the mean percent level of observer determined 'on task' for each session involving the self assessment procedure (Table X). As these two sets of 'on task' estimates compared by the Pearson Rank-Order Correlation statistic were not derived from observations made of the same pupil at the same time, and as self assessment involved brief observations and external assessment five second observations, a high degree of agreement was not expected. Low correlations are thought to indiciate a high degree of variability (i.e. non systematic) and hence inaccuracy in self assessment. As high correlations could be obtained if pupils' inaccurately, but systematically self assessed conservatively or generously, the correlation statistic does not necessarily indicate a good measure of accuracy in self assessment.

Correlations between the mean level of pupils' self assessment of 'on task' behaviour with mean levels of observer determined 'on task' behaviour for all sessions and phases involving self assessment, was low and positive.

Similarly calculated correlations within specific phases were generally higher. For Phases II, III, and VI

high positive correlations were obtained. Self assessment appeared to be highly inaccurate in Phase IV. These correlations are summarized in Table VIII. This finding indicates that the subjective basis of 'self assessment' varied more between phases than within phases (i.e. the pupils were more consistent (if not accurate) in their self evaluations within phases).

There was a large difference between estimates (experimenter and pupil determined) of level of 'on task' behaviour during Phase IV and for sessions during which visitors were present in the classroom. On these occasions there was a concurrent tendency for experimenter determined levels of 'on task' behaviour to minimise and self determined levels to maximise. (Fig. I)

The accuracy of self assessment was inversely related to magnitude of reinforcement (Table X). It was high in the self assessment alone phases and in the 'low value' back-up reinforcer phase, lower in 'access' phase, and totally inaccurate when 'high value' consumption reinforces were provided. Thus although the pupils did self assess accurately when no consequences were provided, the provision of reinforcers led to a rapid decrease in accuracy.

A measure of the variability in self assessment of individual pupils between phases was determined by correlating the mean level of 'self assessment' with the mean level of 'external assessment', phase by phase for each pupil. The correlations obtained ranged from high and positive (e.g. $p = .9732$, $p<.05$) through non significant levels to significant negative correlations, for example ($p = .7000$, $p<.05$).

V. AGE AND I.Q. VARIABLES

Measures of accuracy and variability in self assessment were not found to be significantly correlated with either the age or I.Q. of the pupils. Because of the small sample size and the limited I.Q. and age range of the sample, these results were not unexpected.

One significant correlation was found ($p = .766$, $p<.05$) between I.Q. and behaviour change. This held only between a proportional increase in 'on task' behaviour for each pupil from Phase I to Phase II levels.

VI. TEACHER PRESENT/ABSENT

The recording of pupils' behaviour was continued when the teacher was absent from the room. This data was not used in the normal calculation of levels of 'on task' behaviour but was analysed separately. There were twelve

sessions during which the teacher was absent for more than twenty recording intervals (five minutes). The mean levels of 'on task' behaviour on those occasions were compared to the overall mean level for those particular sessions. (Table XI). The two sets of data were positively correlated (Pearson Rank Order Correlation $p = .66$ $p < .05$). The absence of the teacher from the classroom did not effect the level of 'on task' behaviour. The mean difference between the pairs of scores was low ($\bar{X} = 1.5$ percentage points) and not statistically significant, (Wilcoxon Matched-Pairs Signed-Ranks Test $T=19$, $n=0$).

CHAPTER VI

DISCUSSION

I. NON EXPERIMENTAL SOURCES OF VARIANCE

The major uncontrolled sources of variance in the experiment related to changes in curriculum material and therefore in consequential 'on task' specifications. The academic program was not constant for all phases of the experiment, although the changes that did occur related to proportions of class time spent in an activity, rather than the introduction of completely new activities. (Table VII) indicates the change in mean percentage of time engaged in a particular 'on task' behaviour for each phase (holding the overall level of 'on task' behaviour constant). Thus the proportion of time engaged in reading behaviour (Ar) varied from 4.2% (Phase III) to 25.6% (Phase II), and manipulatory behaviour (Am) from 1.4% (Phase IV) to 32.0% (Phase I) of total 'on task' behaviour.

Some of these changes but not all, could reasonably be attributed to experimental intervention. Clearly in a free operant classroom condition some academic behaviours would have a higher probability of occurance than others. For example, higher levels of 'on task' behaviour could

well be expected during lessons in art (i.e. Ap) than lessons stressing written exercises (i.e. Aw), independent of experimental intervention. A change in lesson content then, could by itself result in changes in the level of 'on task' behaviour, thus weakening the experimental control.

The presence of visitors in the classroom also weakened the experimental control. The presence of two additional teachers (sessions 11, 22, 23) a medical student (session 32) a photographer (session 47), two teachers (sessions 49, 50) two students and teacher (session 64), a teacher (session 68) and two speech therapists (session 71) are cases in point. On some of those sessions the levels of self assessed and externally assessed 'on task' behaviour deviated markedly from previously established and relatively stable levels. In general these two levels tended to diverge from one another.

The increasing proximity of the two week holiday period occurring between Phases 3 and 4, could be interpreted as related to the decrease in level of pupil's self assessed level of 'on task' behaviour which occurred towards the latter stages of Phase 3. The only other similar decreases in other phases were momentary. Nevertheless this interpretation only more clearly establishes the non-reinforcing nature of the provided 'consumption'

consequences, a point which is important to later stages of the discussion.

The presence of the main observer in the classroom during the experiment appeared to be a sufficient discriminative stimuli for an increase in performance on one measure at least. The written output of the pupils increased markedly during the first baseline condition above that for a twelve day pre-experimental period. The written output decreased in the twelve day post experimental period below a level attained in the 'reversal' phase (Table IX). A similar observation to the present has been made in a study by Surrall, Ulrich and Hawkins (1969). These non-specific effects have been termed as 'reactive effect of experimental arrangements' (Campbell and Stanley, 1963). Similar effects have been noted in psychotherapy research and described as 'demand characteristics' and 'expectancy effects' (McNamera, 1972). As the presence of the observer was a constant factor for the entire duration of the study, the experimental validity of the study is not seriously threatened by this factor.

II. EXPERIMENTAL SOURCES OF VARIANCE

The present study demonstrated the use of a self

management technique with a class of mildly intellectually handicapped boys. No other studies have used the techniques of self management with similar atypical populations. No major problem was encountered in having the pupils perform the self assessment procedures described in the 'Method' section.

Self assessment alone increased the level of the target behaviour from the baseline level. Low value 'consumption' reinforcers when subsequently introduced, did not significantly increase this level. The introduction of high value 'consumption' reinforcers resulted in a decrease in the level of 'on task' behaviour and a simultaneous increase in the pupil's self assessed level of 'on task' behaviour. Ths use of 'access' back-up reinforcers in the final phase was successful in increasing the level of 'on task' behaviour above that of prior baseline and self assessment conditions.

Changes in the level of target behaviours are often found to occur when individuals systematically assess their own behaviour. (The studies of Santogrossi et al (1974) and Fixen et al (1972) are illustrative exceptions to this). Where change in behaviour is produced, the self assessment procedure has been described as having conditioned reinforcing properties (in the

present study pupils could be reinforced by the recording of 'ticks'), or as having properties as a discriminative stimulus (e.g. as a cue for 'working').

Broden, Hall and Mitts (1971) found that the reliability of self assessment need not be high for behaviour change to be effected and so attributed behaviour to the discrimitive stimulus function of the self assessment procedure. Similarly Mahoney et al (1973) suggested that self assessment was not simply a conditioned reinforcing process where it contributes to behaviour change. As it has been argued (Wike, 1966) that discriminative stimuli necessarily have secondarily reinforcing properties, this distinction may be misleading.

To the author's knowledge, no study has separated the effects of the self assessment and self reinforcement components in the total self management process using a within-subjects design. Mahoney (1974), in a recent comparative study using four randomly chosen groups in a weight reduction program, found the effects of self monitoring alone to be transient and variable compared to 'self reward for weight loss' and 'self reward for habit improved' groups.

In the present study the self assessment component was found responsible for a major proportion of

the total behaviour change. The low value 'consumption' back-up reinforcers were not effective in producing a behaviour change above the level of the previous self assessment phase. If the effect of self assessment had not been determined separately, self reinforcement in this phase would have been compared only to the base-line level and erroneously reported as successful in producing a behaviour change. Since the reinforcing nature of a stimulus can only be operationally determined (by observing whether its contingent use actually modifies behaviour), many self management studies using positive self reinforcement may have erred in claiming the successful application of self reinforcement without first seperating out the effect of self assessment. The reinforceing nature of self administered consequences is in doubt unless it can be shown that they do effect behaviour change over and above that attributed to self assessment.

With the introduction of high value 'consumption' reinforcers in the present study, the pupils simply made the most probable response, that of taking all available reinforcers. There was no 'restraining force' (Premack and Algin, 1973) to prevent them from so doing. A few other studies have similarly reported a failure with self reinforcement. Santogrossi's et al (1974) pupils maximised their self assessment and control was reverted to an externally administered conventional token program.

Glynn and Thomas (1974) introduced a 'cueing' device for the maintenance of accurate self assessment.

The effects of differing contingencies of reinforcement is well known (Reynolds,1968). In contrast the literature on the effect of differing magnitudes of reinforcement in behaviour modification is sparce. Estes (1971) summarised the contribution of a number of studies researching the variables associated with magnitude of reinforcement in externally managed contingencies as follows: 'a predicition of the effects of any particular history of the organism with respect to a range of reward values'. As in applied settings the reinforcement history is rarely known, this prediction is singularly unhelpful.

Liebert and Allen (1967) and McMains et al (1969) have studied the relationship of the magniture of reinforcement provided to a model, to the later self rewarding responses of the observers. These analyses bear only marginally on the present problem.

In the present self management study, changes in the relative magnitude of the back-up reinforcers and in their nature (from 'consumption' to 'access') resulted respectively to no change in behavioural level, to a decrease in level and finally an increase. Clearly reinforcer type and magnitude is an issue of major importance to a study of 'self management'.

Since, in order to be effective, reinforcement must be contingent on the occurance of the target behaviour, accuracy of self assessment is crucial to the success of self management programs. Thus at the theoretical level only (Blalock, 1964), it could be predicted that the level of 'on task' behaviour in the present study would be lowest when self reinforcement was non contingent, when 'unearned' (i.e. freely available, and also randomly occuring or not available at all). Major discrepencies between externally and self assessed levels of 'on task' behaviour were apparent on occasions when visitors were in the room and during Phase IV, the phase in which high value 'consumption' reinforcers were utilized. Because neither of the two variables of self and external assessment were independently controlled, the nature of their relationship cannot be experimentally established.

The accuracy of pupil self assessment appeared to be inversely related to the magnitude (established a-priori) of the provided 'back-up' reinforcers. (Table X). When no (self assessment alone) or low value 'back-up' reinforcers were provided, accuracy of self assessment was high. With the provision of high value 'consumption' reinforcers the accuracy fell dramatically. Accuracy during the reinforcement phase with 'access' consequences appeared to take an intermediate position. It could be predicted that in the absence of external control, the

placing of 'ticks' rather than 'on task' behaviour per se would be the reinforced variable , and thus accuracy of assessment would in the long run decrease.

It has been shown that accuracy in self assessment can be taught. Drabman et al (1973) provided 'bonus' tokens for matching the teachers evaluation and Fixen et al (1972) in a non school setting, improved the reliability of self reporting by making points contingent on agreement between the self report and a trained peer's report. They thus provided a 'restraining force' to prevent unearned acceptance of reinforcers. Many experimenters have provided 'prior experience with externally administered reinforcement' (Bolstad and Johnson, 1972; Glynn et al, 1973; Kaufman and O'Leary, 1972). This provision could not accurately be described as 'training' or result in the development of a functional 'restraining force' and the relevance of it to a study of self management uncertain. The long term stability of behaviour change produced by the self management strategy in all these studies was not established.

In the present study, accuracy of self assessment was established (without prior training) and maintained in the first three phases, but the accuracy fell with the introduction of high value reinforcing consequences. Accuracy increased when these consequences were removed (Phase V).

The effectiveness of 'prior training' on accuracy of self assessment can only be convincingly shown when it is operationally demonstrated that the consequences provided for self reinforcement are indeed reinforcing. This was not done in the above studies.

The provision of 'access' reinforcers in the present study contributed to positive behaviour change beyond that achieved in the previous baseline and self assessment phases. The study was concluded before the long term effectiveness of 'access' back-up reinforcers in self reinforcement could clearly be established. Tentatively it could be concluded that 'access' back-up reinforcers are more effective and produce fewer problems than 'consumption' reinforcers.

The implication of the present analysis is clear. Specific concurrent reinforcement contingencies must be designed to ensure the accuracy of self assessment and the consequent contingent delivery of reinforcement. In addition the separate effects of self assessment must be distinguished from self reinforcement in order to establish the effectiveness of the back-up reinforcers in the self management strategy. Further, the issues of magnitude and type of back-up reinforcers seems critical to the success of self management strategies. These are

all areas which have received scant attention in the research literature thus far, and deserve further investigation.

Research attention could also usefully be directed towards determining the long term effectiveness of self management strategies, and in particular the stability of behaviour change resulting from self assessment alone. Drabman et al (1973) provides the only research evidence for generalization of behaviour change from a classroom self management program, and that concerned generalization to times of the day in which the program was not in effect.

CHAPTER VII

CONCLUSIONS

Despite the implication that the 'self' in self management might be misplaced, (and proof of such a generalization is beyond the scope of empirical methods: Dukes, 1965), the procedures described as 'self management by positive self reinforcement', do form a distinct paradigm within the field of operant psychology.

The focus of experimental intervention in the present analysis (at least for a successful outcome) is, to revert to previous terminology, on the direct manipulation of 'controlling' responses rather than the 'controlled' response or terminal behaviour. In one sense the target response is simply redefined. The experimenter reinforces certain controlling responses which in turn increase the probability of occurance of the terminal behaviour. In the present study the controlling responses were the matching of the self assessing response to emmitted behaviour, then matching a self reinforcing response to the self assessment, thus ultimately matching the self reinforcing response to the occurance of the terminal behaviour. The terminal behaviour is not directly reinforced by the experimenter as is usually the case within operant psychology studies.

The practical advantages of this arrangement are uncertain. It is difficult to envisage an environment in which terminal behaviours could not be directly reinforced, but in which appropriate controlling behaviours could be experimentally manipulated. Of course controlling responses, through the use of appropriate contingencies of reinforcement, can be maintained in environments where external survellience is not possible. But then, so toocan terminal behaviours. It could then be argued that the desired terminal behaviours might more simply and effectively be reinforced directly by the experimenter. It also seems unlikely that a small number of experimentally manipulated controlling responses could maintain a large number of terminal responses. Logically, one would expect each discrete terminal behaviour to be 'chained' to at least one discrete controlling response.

The earlier promise that the use of self management techniques (particularly the use of positive self reinforcement in education settings) may lead to enhanced generalization of treatment effects over and above that gained following the use of more orthodox externally managed reinforcement programs, thus in the final analysis does not seem justified.

Atthowe (1973) has listed techniques which enhance

treatment generalization. The techniques are:

"(a) the use of intermittent reinforcement to maintain the habit after it has been established,

(b) overlearning,

(c) the creation of a variety of conditioned reinforcers and conditioned stimuli,

(d) increasing the amount of work or gradually lengthening the chain of behaviours required to attain reinforcement,

(e) gradually reducing the magnitude of the reinforcer,

(f) gradually 'thinning' the schedule of reinforcement, and

(g) gradually fading the old stimulus while substituting in its place a new and more 'natural' stimulus". (p.35)

Attowe argues that these precautions are essential but not enough to maintain therapeutic gains. 'We have not taken the next step; we have not attempted to control the eliciting conditions and reinforcers in the person's natural environment which is the maintaining milieu.' (p.35) Others (e.g. Skinner, 1971) similarly see the main challenge for operant psychology as the redesigning of man's environment so that desirable behaviours would be systematically elicited, rather than changing his behaviour in certain limited circumstances.

The effects of behaviour modification programs will remain, to use a distinction made by Lindsley (1964), 'prosthetic' rather than 'therapeutic' if this challenge is not met.

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APPENDICES

TABLE I

CODING CATEGORIES

INAPPROPRIATE BEHAVIOUR

M	Gross motor movement; out of seat, body turned more than 30 touching other child or his equipment, throwing kicking objects.
N	Excess noise; talking without permission (other than simple request), calling for attention without hand up, crying, screaming, laughing inappropriately.
F	Fiddling with self, or objects (e.g. non instructional material or with instructional material inappropriately).
S	Staring fixedly from focus of less (e.g. from lesson material books, teacher or other child as appropriate).
O	Out of room - following inappropriate behaviour.
	NOTE: Select behaviour first appearing on list.

APPROPRIATE BEHAVIOUR

At	One to one instruction with teacher.
Ar	Reading; manipulating reading material appropriately e.g. eyes on reading material, turning pages, locating material as instructed.
Aw	Writing; pencil, rubber in hand and applying to paper, looking at material being written or copied from, locating material as instructed.
Ap	Painting, drawing; applying paint or pencil to paper appropriately, tracing, assembling, locating material.
Ac	Cutting out, pasting; from pictures, papers, books etcetera.

Am Manipulating instructional material - Q rods, etcetera, counting, sorting.

Ai Informal 'free' activity; games, cards, blocks etcetera.

Af Attending to teacher instruction, oral discussion not requiring manipulation of teaching material

Ah Hand up for teacher attention or by teacher's desk on request

Ao Outside classroom with permission or on request

NOTE: Data for pupil discarded if absent for more than five observations per session.

TABLE II

LIST OF BACK-UP REINFORCERS

Phase III

coloured stickers
plastic soldiers
small plastic cars
balloons
pencil-cap rubbers

Phase IV

'dinky toys'
small metal aeroplanes
bubble blowers
stamp printing sets
metal soldiers
metal artilary pieces

Phase VII

as in Phase IV plus access to -
sets of toy soldiers
car tyres
goalie
listening to radio
listening to record player
listening to tape recorder
reading
writing
being read to
french knitting
bike riding
playing on slide
dancing
'Hornby' Train set
'Meccano' set

TABLE III

PERCENT AGREEMENT BETWEEN TWO INDEPENDENT OBSERVERS ON BEHAVIOUR CATEGORY

	Percent agreement on specific behavioural category	Percent agreement on 'on' or 'off-task' nature of behaviour	Difference between estimates (main observers estimate subtracted from independent observers' estimate) of observers
Phase IV	85.5	96.5	-3
	80.0	91.8	0
Phase V	89.0	98.0	-2
	93.0	100.0	0
	80.0	91.0	-4
	84.0	98.0	+1
	90.0	94.0	-1
	83.0	94.0	-5
	83.0	92.0	-1
Phase VI	89.0	97.0	-5
	91.0	98.0	+4
	82.0	93.0	-2
X	85.2	X 95.1	X 1.5

TABLE IV

SIGNIFICANCE OF DIFFERENCE BETWEEN MEAN LEVELS OF 'ON TASK' BEHAVIOUR FOR SELECTED PHASES USING WILCOXON MATCHED PAIR SIGNED RANKS TEST (SEIGEL, 1956)

Comparison	T=	N=	p< (2 tail)
Phase I - Phase II	0	9	.01
Phase I - Phase III	0	9	.01
Phase I - Phase IV	9	9	ns
Phase II - Phase III	9	9	ns
Phase II - Phase IV	12	9	ns
Phase III - Phase IV	3	8	.02
Phase IV - Phase V	18	9	ns
Phase V - Phase VI	3	9	.02
Phase V - Phase VII	0	9	.01
Phase VI - Phase VII	6	9	.05

TABLE V

MEAN PERCENT LEVEL OF 'ON TASK' BEHAVIOUR FOR EACH PUPIL, EACH PHASE

Subject	Age	I.Q.	Phase I	Phase II	Phase III	Phase IV	Phase V	Phase VI	Phase VII
1	11- 4	75	74.5	83.3	90.1	100.0	85.0	90.0	95.0
2	11-10	64	53.6	84.6	80.0	80.0	74.3	83.7	88.8
3	12- 2	71	69.0	70.6	71.1	57.7	61.8	70.0	88.7
4	13-10	51	65.0	78.6	88.8	65.5	84.4	85.0	90.0
5	9- 6	68	55.3	78.4	84.4	74.2	65.8	81.2	78.7
6	11- 7	62	60.0	76.6	72.2	63.3	72.2	65.0	78.7
7 C.P.	11-11	77	62.9	75.3	74.2	54.2	50.0	57.5	81.4
8	11- 8	75	66.0	78.0	90.1	84.4	67.2	86.2	82.5
9 Aphasic	11- 1	76	67.6	76.0	91.1	71.4	77.0	88.5	85.0
10	14- 2	51	73.36	80.0	75.5				
11	12- 5	54	76.36	71.3	68.9				
12	13- 0	56	84.5	84.0	76.6				
13	11- 9	66				47.1	60.7	67.5	55.7
14	8- 7	84				81.6	87.8	73.7	77.5

TABLE VI

MEAN PERCENT OF SPECIFIC BEHAVIOURS OF TOTAL OBSERVATIONS FOR EACH PHASE, NINE PUPILS

	PHASE						
	1	2	3	4	5	6	7
M	7.4	4.2	3.9	1.8	3.4	4.6	2.0
N	4.6	2.7	3.2	2.7	3.1	1.6	1.8
F	7.7	5.6	4.3	5.6	8.2	6.4	2.6
S	15.3	9.8	6.7	13.8	13.6	8.7	8.6
O	0	0	0	0	0	0	0
At	6.0	7.8	5.8	10.1	6.2	6.3	6.1
Ar	7.4	19.8	3.5	15.0	15.0	8.8	27.3
Aw	13.8	18.7	16.5	21.9	12.9	11.0	20.5
Ap	0	6.7	21.4	6.7	3.2	25.6	6.7
Ac	0	1.1	.4	1.1	10.1	5.7	4.8
Am	20.4	17.2	16.7	1.1	1.1	17.5	12.2
Ai	2.2	.6	3.0	.3	1.5	.7	1.0
Af	9.6	2.9	.7	1.6	0	1.1	1.7
Ah	0	0	.5	0	1.2	.1	0
Ao	.1	1.1	.5	.8	0	.7	.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

TABLE VII

SPECIFIC 'OFF TASK' BEHAVIOUR OBSERVATIONS AS A PERCENT OF ALL 'OFF TASK' OBSERVATIONS, NINE PUPILS

	PHASE						
	1	2	3	4	5	6	7
M	21.1	18.8	21.4	7.5	16.2	21.5	13.7
N	13.4	12.1	19.7	15.0	14.7	7.8	11.7
F	22.0	25.2	23.4	22.5	39.1	30.0	17.6
S	43.6	43.7	37.2	54.9	64.7	40.5	56.9
0	0	0	0	0	0	0	0

TABLE VIII

SPECIFIC 'ON TASK' BEHAVIOUR OBSERVATIONS AS A PERCENT OF ALL 'ON TASK' OBSERVATIONS, NINE PUPILS

	PHASE						
	1	2	3	4	5	6	7
At	9.6	10.1	6.9	13.6	8.6	8.0	7.1
Ar	11.8	25.6	4.2	20.2	21.0	11.1	32.1
Aw	22.0	24.2	19.8	29.0	18.0	13.9	24.1
Ap	0	8.6	25.7	9.0	4.4	32.5	7.8
Ac	0	1.4	0	1.4	14.1	7.2	5.6
Am	32.6	22.2	20.0	1.4	1.5	22.2	14.3
Ai	3.5	.7	3.6	0	2.0	0	1.1
Af	15.3	3.7	0	.2	0	.1	2.0
Ah	0	0	0	0	1.6	0	0
Ao	0	1.4	0	.1	0	0	0

TABLE IX

MEAN NUMBER OF WORDS WRITTEN FOR EACH PHASE PLUS PRE AND POST EXPERIMENTAL CONDITIONS

Pre Exp	1	2	3	4	5	6	7	Post Exp
5.09	9.60	13.10	7.67	25.07	16.23	5.55	17.50	15.68

MEAN NUMBER OF WORDS COMPLETED FOR EACH PHASE PLUS PRE AND POST EXPERIMENTAL CONDITIONS

Pre Exp	1	2	3	4	5	6	7	Post Exp
.80	.90	7.77	15.93	2.60	5.55	12.62	3.16	2.07

MEAN NUMBER OF WORDS WRITTEN OR COMPLETED FOR EACH PHASE PLUS PRE AND POST EXPERIMENTAL CONDITIONS

Pre Exp	Phase 1	2	3	4	5	6	7	Post Exp
5.8	10.5	25.8	23.6	27.6	21.7	18.1	20.6	17.6

PROPORTION OF WORDS WRITTEN OR COMPLETED FOR EACH PHASE

Phase 1	2	3	4	5	6	7
1.00	1.80	1.91	1.68	1.36	2.16	1.31

TABLE X

PEARSON RANK ORDER CORRELATIONS BETWEEN EXTERNAL AND SELF ASSESSED LEVEL OF 'ON TASK' BEHAVIOUR

	$\rho =$	$p <$
Phase 2	.508	.05
Phase 3	.6125	.05
Phase 4	.041	ns
Phase 6	.704	.05
Phase 7	.457	ns

TABLE XI

MEAN LEVEL OF 'ON TASK' BEHAVIOUR: TEACHER ABSENT/ PRESENT, NINE PUPILS, TEN EXPERIMENTAL SESSIONS

	Teacher Absent	Teacher Present
Phase 1	65.0	70.0
Phase 3	81.0	82.0
Phase 4	85.8	75.7
	66.6	72.2
Phase 5	66.6	73.3
Phase 6	83.3	78.8
	69.0	80.0
	82.3	77.7
	75.0	77.7
Phase 7	87.7	83.0